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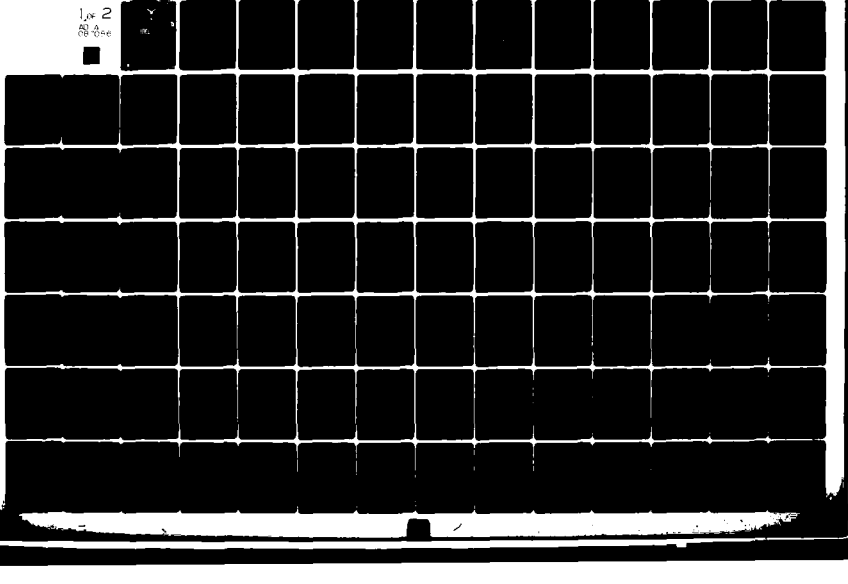




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(9) Master's Thesis,

(6) AN ANALYSIS OF ESSENTIAL LOGISTICS SUPPORT DATA ITEMS.

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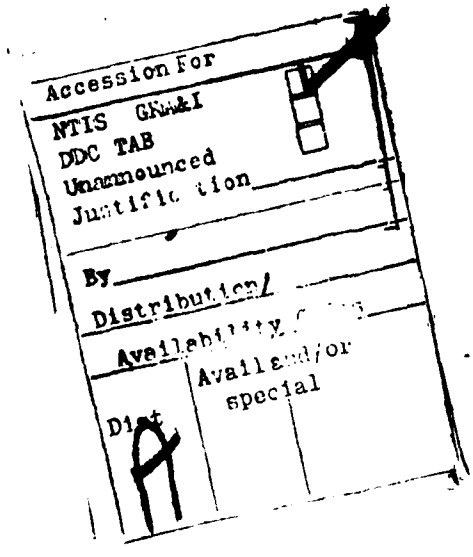
This thesis involves the analysis of logistically important data that are procured and funded by System Program Offices (SPOs) within Aeronautical Systems Division (ASD). Data which are procured by the SPOs, but which are funded by the Air Logistic Centers (ALCs) are not addressed in this study. The results of this thesis are designed to assist the logistics manager assigned to an aeronautical SPO by providing to him/her a ranking of Data Item Descriptions (DIDs) by their logistics value. This judgment was furnished by logistics data managers and functional users in the ALCs, and by selected SPO logistic managers. It is hoped that the results of this research will help SPO logistic managers in identifying DIDs that have logistic value to the aeronautical system being acquired. The final results include a ranking of 60 DIDs into four categories ranging from high to low logistics value, along with a brief description of the purpose of each DID studied.



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# AN ANALYSIS OF ESSENTIAL LOGISTICS SUPPORT DATA ITEMS

A Thesis

Presented to the Faculty of the School of Systems and Logistics

of the Air Force Institute of Technology

Air University

In Partial Fulfillment of the Requirements for the

Degree of Master of Science in Logistics Management

By

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June 1980

This thesis, written by

Mr. Carmine J. Forzono

and

Captain Robert I. Mitchell

has been accepted by the undersigned on behalf of the faculty of the School of Systems and Logistics in partial fulfillment of the requirements for the degree of

MASTER OF SCIENCE IN LOGISTICS MANAGEMENT

DATE: 9 June 1980

Charles L. Feeley
COMMITTEE CHAIRMAN

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# Chapter 1

## INTRODUCTION

Included within this thesis is the description of the processes undertaken to identify those logistically important Data Item Descriptions (DIDs) that are procured and funded for by System Program Offices (SPOs) belonging to Aeronautical Systems Division (ASD). The results of the analysis of 60 DIDs are presented in the results section, and in one of the appendices entitled "The DID Cookbook for DPMLs." This appendix summarizes the results, with a hope it will provide an easy to use reference and rank ordering of the 60 DIDs studied. The cookbook also provides a brief description and purpose of each DID.

The background material forms the basis for the statement of the research problem which must be bounded by considering the limits of the research. This is followed by several pertinent research questions, a number of research objectives and a discussion of related research materials. Next is a short explanation of the authors' reasons for undertaking this research topic. Chapter 2 on methodology is used to describe the approach of using a questionnaire to gather the information needed to access

the logistics value of the DIDs. The data analysis plan is then explained and followed by the analysis of the questionnaires. Again, the results are presented in the main body of the thesis, as well as in the appendix entitled "The DID Cookbook for DPMLs." Lastly, several recommendations are made concerning further possible analyses of the information gathered and possible methods for further improvement of data management.

## Background

System Program Office. The acquisition of all types of data is of primary concern to the program manager (PM) of the System Program Office (SPO), not only because it includes the data with which he manages the program, but also because it is costly. Proliferation of data continues to be a Department of Defense (DoD) concern. In order to achieve a cost effective program, it is important that only necessary and essential data are procured, and at a reasonable cost. However, this is often a difficult task since each functional group supporting a program requests whatever data they desire. This makes the task of integrating and reviewing all data complicated. Problems experienced include: buying similar or identical data in different formats, buying data DoD never uses, data existing in a DoD depository that the requesters were not aware of, and data which cost more than the expected benefit of the data (3:6-7). Although

these problems are lessening somewhat by the development of DoD standardized data item descriptions, much unneeded data are still being procured while other essential data items are not being procured or are not procured at the most economical juncture.

Data. DoD Instruction 5010.12 and Air Force Regulation 310-1 describe data and a number of major subdivisions: technical publications, engineering data, management data, and support data, plus several other categories such as computer software documentation and reprocurement date.

(1) Technical publications. Technical orders or manuals are developed by the contractor for use by DoD service personnel. These publications are used primarily for the training of personnel in the operation and maintenance of the system hardware and related subsystems.

(2) Engineering data. Engineering data consist of drawings, associated lists, specifications, and other documents used during the acquisition phase for design disclosure, testing, support engineering, and production of the contracted items. During the life cycle of the system these data are used for modification analysis, overhaul and repair, and spares procurements.

(3) Management data. These data are used primarily by technical specialists to assist them in their task of system management. They include program schedule data,

contractor cost reports, cost and schedule performance reports, technical status reports, schedule analysis, etc. Without these items the specialists would encounter difficulty in managing the program.

(4) Support data. Support data consist mainly of provisioning data required when buying spare and repair parts, and those data which document logistics support. Included are supply and maintenance information, transportation, packaging information, etc.

Data importance. The importance of acquiring the correct contractor data should be evident. Data are fundamental to every phase of the systems life cycle. Due to the increasing complexity of weapon systems, the DoD could not possibly develop all the required data in-house as it once did. These data must be procured from the involved contractors during the process of buying the system.

Data acquisition process. The data acquisition process involves the identification of data needed to meet statement of work goals, and the negotiation and actual buying of the data from the contractor.

(1) Data call. The focal point for data management within a SPO is the program data management officer (PDMO). This person shapes the data requirements package which will be acquired from the contractor. These required data are identified by response to a "data call." Data calls

generally include the AFSC personnel (in the SPO), research and development personnel, AFLC personnel, along with personnel from the using command and Air Training Command. All of these various groups do, and should, have a say in what data are being acquired.

(2) Data requirements. Data requirements that are imposed on the contractor are chosen from a standard list of data item descriptions (DIDs) contained in DoD 5000.19L, Vol. 11, Acquisition Management Systems and Data Requirements Control List (AMSDL). The DID specifies the range, scope and format of the expected data and such information concerning each DID is found on DD Forms 1664. These standard DIDs need to be carefully researched to ensure that the correct one is chosen prior to any modifications, "tailoring," or development of a unique DID. A user is encouraged by DoD D-4120.21 to "tailor"; that is, to delete sections from the standard which are not needed for his particular program. A tailored DID is then categorized as a modified DID. Additions to a standard DID must be processed as a unique DID.

From these inputs, the PDMO consolidates the data requirements and prepares the rough draft version of the Contract Data Requirements List (CDRL), DD Form 1423, for approval by the Data Requirements Review Board (DRRB). The final approved CDRL is the contractual document used to identify and establish the program data requirements.

Use of DD Form 1423 also helps achieve the following objectives of the Department of Defense with respect to the acquisition of data:

(i) To acquire most economically the minimum amount of data needed to procure and support military systems, material and services.

(ii) To assure the acquisition of required data on time to serve its intended purpose.

(iii) To establish data requirements on the basis of needs in management, engineering and logistics functions of the DoD; and to fulfill these needs on the basis of cost-effectiveness analysis.

(iv) To specify data requirements in solicitations for proposals in sufficient detail to provide a basis for a full, clear, and firm understanding between the Government and the contractor with respect to the total data requirements at the time the contract is placed. This requirement may be satisfied by a contractual provision for the right to defer the selection, ordering, or delivery of technical data specified in the contract.

(v) To provide competent administration of contracts requiring the furnishing of data, and assure that all contract provisions pertaining to data are fully satisfied.

(vi) To maintain quality assurance procedures in the acquisition of data to assure the adequacy of the data for its intended purpose.

(vii) To provide for the continued currency of acquired data in consonance with requirements.

(viii) To prevent the acquisition of duplicate or overlapping data pertaining to material systems or services when data which would serve the same end has been or is being acquired by the Government from the same or other contractor [2:4-5].

(3) Negotiation. Following analysis and approval by the DRRB and the procurement committee, the CDRL is negotiated into the contract as a deliverable contract line item. As such, the contractor must respond to each DID and submit an estimated price for that DID. As part of the contracting process, these CDRL prices are negotiated between the SPO and the contractor. Although this process may vary greatly among the different SPOs, one individual is

primarily involved in the negotiation of CDRL prices: the principal contracting officer (PCO). During negotiations, a number of tradeoffs are often made in terms of costs. Usually, the program manager's (PM's) primary concerns are system performance, cost, and schedules, and not long-term logistics support data. These logistics support data are essential during the operational life cycle of the system, but are often compromised during the tradeoff negotiation process. Funding for hardware related requirements takes precedence over support data which is sometimes deferred for later funding. This is not done because the PM, PDMO, or PCO are unconcerned about life cycle costs; but, because they are often pressed for funds and do not understand the necessity of the particular data item nor realize the increased costs of the data items resulting from deferral.

(4) Impact of poor data acquisition. It is important that the necessary data be bought by the SPO because these data have many uses throughout the life of the system. Data not contracted for may not affect SPO management; however, this lack may affect a depot level maintenance activity of an Air Logistics Center (ALC) years later (at which time, the data will either be unavailable or prohibitively costly). As was pointed out early in the section on data uses, data requirements impact the entire range of a system's life. Each functional area, whether it be production, logistics, or training, is an integral part of the

weapon system and in order to effectively perform the mission they must all work together.

Maintenance personnel have historically decried the Air Force acquisition process because their required data items are intended for long range use and are sometimes not procured. In some instances technical orders are grossly inaccurate. Such problems demand corrections and reprinting, which are a major cost item to the Air Force. Another factor is that the systems are operational for longer periods now, and require higher quality data items to maintain systems in operational status. The category of logistics data should not be taken lightly, to be acquired or not, with little justification for deletion or deferral.

Problem Statement

The researchers feel that the basic problem addressed by the thesis is that logistics personnel often lack the knowledge of which data are most important in terms of supporting DoD hardware throughout its life. When events occur such as funding shortages or contractor recommendations which may result in the cancellation of some data items, the DPML may not be able to provide an adequate defense for not cancelling critical data items. The researchers also feel that most SPO (AFSC) personnel do not know or understand which data items are logistically critical, how and when they are used, when they should be

ordered, nor when the contractor prepares them. An important aspect of this problem is that the DPML currently lacks a priority list of which DIDs funded by the SPO are most essential for logistics. They have little guidance to compare one logistics support type DID to another. It is believed by the authors that the attached DID cookbook will remedy that void of logistics intelligence.

## Research Boundaries

Assumptions/Limitations. The DIDs studied involve those funded by a SPO, not the ALCs, and which are put on contract after data call submissions are reviewed and approved by the SPO's data requirements review board (DRRB). Although the contract data requirements list (CDRL) may contain 150 DIDs on one program (CDRLs from the F-16, A-10, KC-10, F-15 and F-5 were reviewed), the list studied in this thesis only included 60 DIDs. Of the total DIDs normally procured by a SPO, it was felt that these 60 had the most potential logistics value.

The analysis of these DIDs in terms of their logistics value was based upon the viewpoints of ALC data managers, ALC data users, and logistics managers/DPMLs within ASD SPOs. Views from other sources, such as contractors, Air Training Command, and using commands were not sought.

Research questions/objectives. The basis of this research effort was structured on the following questions and objectives.

Questions:

1. Of all the DIDs funded by a SPO, which should receive the attention of the SPO logistics manager/DPML as being essential logistic data items?

2. What is the purpose of these logistically important DIDs?

3. To what degree are these logistically important DIDs used by logistics personnel?

Objectives:

1. To provide a reference document for SPO logistics managers/DPMLs which will easily show the logistics importance of DIDs normally funded by a SPO.

2. Provide a brief description of the DIDs investigated and an indication of the degree to which these DIDs are used by logistics personnel.

## Related Research

In attempting to gather background information, the researchers searched the Defense Logistics Studies Information Exchange (DLSIE) and the Defense Technical Information Center (DTIC) with only limited success. There were documents found with the subject of data management; however, they were primarily concerned with management information

systems. Two documents which will be useful to provide this general information on data needs are The Data Base for a Project Management Information System by Lieutenant Colonel Joseph Paul Goncy and Information Needs for Decision Making by Program Management Office Personnel by Lieutenant Colonel David M. Wilde. Although these two publications do not address the subject of logistics support data, they were useful for a general understanding of SPO data uses and processes. Related bibliography entries dealt primarily with the establishment of conventional management information systems.

A more useful document received from DTIC is Contract Data Management by Ronald J. Duddleston. Again, this document does not address specifically logistics support data; but it does discuss overall data management. It provides an overview of the entire data management discipline, reviewing DoD policies and some shortcomings in the system. The major drawback to this document is that it deals with Navy project offices and policies. However, since much of the guidance in data management is from the DoD level, the document is at least partly applicable to this study.

Mr. Duddleston describes the history of DoD data management and discusses early problems in data management and the steps which the DoD took to resolve them. Two significant DoD steps were the development of the Acquisition Management Systems and Data Requirements Control List (AMSDL)

and the establishment of the DRRB. There were also several DoD directives (DoD I 5010.12, D 5000.19 and D 5000.32) written to direct and control the acquisition of data. A comparison of the problems listed by Mr. Duddleston as being present prior to these DoD actions with current problems is most interesting. Many of the same problems appear on both lists.

Another document found useful as an introduction and overview of the data management/acquisition process is Principles of Data Management, Vol. I/Vol. II, prepared by the Department of Special Management Techniques, School of Systems and Logistics. These textbooks are used in DoD course PPM 370 for data managers. They provide excellent treatment of the discipline of data management, and also aid functional and management specialists in understanding DoD data requirements, policies, and procedures. These texts have proven invaluable to the researchers in their attempt to learn the complexities of data acquisition and management. Of particular interest was a description of the data call process, the workings of the DRRB, and the manner in which the data management function fits into the overall acquisition process.

A large portion of knowledge gained from the research came directly from official publications of the Department of Defense and Air Force. There are several official publications which have a direct bearing on the

problem: DoD Directive 5000.19L, Vol. II, Acquisition Management Systems and Data Requirements Control List (AMSDL) is a listing of authorized or standard DIDs. These are the standard data item descriptions that were referred to earlier. Another document, DoD I 5010.12, Management of Technical Data, establishes policies for the management of technical data.

> The primary objective of this document was to assure optimum effectiveness and economy in the support of systems and equipment within DoD through a comprehensive data management program [3:9-10].

The Defense Acquisition Regulation (DAR) (formerly the Armed Services Procurement Regulation (ASPR)), Vol. 16, details the relationship of the DID to the statement of work (SOW). In order to properly acquire the appropriate data both the CDRL and SOW must be correctly completed and compliment each other. The CDRL specifies the deliverable data items, while the SOW specifies the work effort by the contractor. Other sections of the DAR also provide guidance to various phases of data management, such as rights in data, deferred data, and contractor warranty of data.

Another major portion of the information gathered in this research effort came from three data management experts: Mr. Charles Feeley, Ms. Ramona Fulford, and Mr. Roy Sugimoto. Mr. Feeley instructs the DoD data management course, and as such, is in the position of receiving inputs from a variety of sources ranging from PDMOs to

functional users. He has also served as a consultant on a number of source selections. Ms. Fulford is a former data manager for an ALC and presently is the "lessons learned" monitor for the Air Force Acquisition Logistics Division (AFALD). In this position, she is responsible for ensuring that AFALD and the Air Force in total learn from past performance and experiences. Mr. Sugimoto is the PDMO for the F-16 SPO and has a number of years of experience in the field.

## Motivation

The authors were motivated to undertake this endeavor for a variety of reasons. First, they were both in the acquisition program and wanted to deal with a "live but unsolved" acquisition problem. Second, they wanted an area that would be applicable to a future assignment. Both had been peripherally involved with data in the past; one as an engineer in a SPO, and the other as an AF maintenance officer. Lastly, as well as wanting to learn more about data, they wanted to provide the Air Force with a useful product; in this case, a product that would aid logistic managers/DPMLs in identifying logistically essential data items.

## Plan of the Report

The methodology of the research is presented in the second chapter. This methodology includes an

explanation of how the final ranking of logistics DIDs by value was determined. The use and structuring of a questionnaire, the selective population involved, and the method of interpreting and analyzing the questionnaires are also addressed.

Chapters 3 and 4 present the analysis and results of the data gathered. One appendix to the main body of the thesis called "The DID Cookbook for DPMLs" is used to summarize the results, with a hope it will provide an easy to use reference and rank ordering of the 60 DIDs studied. In this appendix the DIDs are in a ranked form, consisting of categories ranging from high logistics value to low logistics value.

The thesis ends with a conclusion and recommendation chapter. It seems that the data acquisition management field can easily afford other AFIT research studies.

## Chapter 2

## METHODOLOGY

### The Approach

Population. As expressed in the statement of the problem, data item descriptions (DIDs) are the elements of this study. The universe is the total of all DoD DIDs as they are listed and described in DoD 5000.19L, Vol. II, The Acquisition Management Systems and Data Requirements Control List (AMSDL). "The AMSDL identifies acquisition management system/source documents and data item descriptions (DIDs) available for contractual application [1:11]." Within the AMSDL document, functional codes exist for categorizing each DID into a group that most correctly represents its use. The letter "L" in the DID number, for example D1-L-3312, Repairable Assembly Listing, represents the category group of logistic support. A list of these functional codes that describe the use of the DIDs is presented below:

A--Administrative/Management

E--Engineering and Configuration Documentation

F--Financial

H--Human Factors

L--Logistics Support

M--Technical Publications

P--Procurement/Production

R--Related Design Requirements

S--System/Subsystem Analysis

T--Test

V--Provisioning

The number of DIDs listed in the AMSDL is around 3500. Since more DIDs than just functional code L impact on total system logistics, the task of identifying the population of DIDs which might be important to logistics personnel was a task in itself.

The method used to develop the population involved a number of steps. Based on the problem, the research DID list was initially limited to those DIDs used by the USAF, and further by those whose funding is the responsibility of System Program Offices (SPOs) within the Aeronautical Systems Division (ASD). From this point, a number of Contract Data Requirement Lists (CDRLs) were obtained from five Weapon System SPOs (F-16, KC-10, A-10, F-15, and F-5). The CDRL is made up of a number of DD Form 1423s which specifically identify those DIDs that are on contract. A numerical listing of all DIDs contracted for in these programs was then compiled. This list consisted of 147 DIDs and included all of the functional codes of the AMSDL. This list had many DIDs which were not related to the task

of identifying, ranking, and investigating DIDs required by logistics personnel. The last step in developing the actual population with which to work called for the analysis of the 147 DIDs by the researchers with the help of Ramona Fulford and Charles Feeley. With the assistance of these two dedicated experts in the data field, the researchers were able to narrow the list down to 78 DIDs. This number was further reduced to 60 with the removal of many of the DIDs relating to provisioning. Provisioning DIDs are among those DIDs usually selected and paid for by the Air Logistics Center (ALC) responsible for the eventual depot support of a new weapon system. Therefore, such DIDs were not funded by the SPO and consequently not considered in this study. This final list of 60 DIDs was a judgment sample/population that hopefully represents those SPO funded DIDs needed by logistics personnel to support future weapon systems. A listing of these 60 DIDs is presented in Figure 1.

Acquiring the Data

With the identification of 60 DIDs, the task of addressing how to get the needed data to answer the basic research questions was the next step. The approaches contemplated to answer these questions were (1) to survey logistic data personnel for their answers, or (2) to perform a detailed investigation of each DID by the researchers. The latter of these two approaches is discussed first.

| | |
|---|---|
| DI-A-3029 | Agenda-Design Reviews, Config. Audits & Demo. |
| DI-A-6102A | Support Equipment Plan (SEP) |
| DI-A-3102A | Configuration Item Development Specification |
| DI-A-3103A | Configuration Item Product Fabrication Spec. |
| DI-A-3104 | Addendum Specification |
| DI-E-3106 | Specification Maintenance Doc. (Equip./ Munitions) |
| DI-E-3109 | Selected Item Configuration Records (SICR) |
| DI-E-3110A | Component Operational Data Notice (CODN) |
| DI-E-3119A | Computer Program Development Specification |
| DI-E-3120A | Computer Program Product Specification |
| DI-E-3121 | Version Description Document (Computer Programs) |
| DI-E-3122 | Configuration Index (Computer Programs) |
| DI-E-3126A | Request for Nomenclature |
| DI-E-3128 | Engineering Change Proposals (ECPs) |
| DI-E-3129 | Request for Deviation/Waiver |
| DI-E-3130 | Process Specification |
| DI-E-3131 | Material Specification |
| DI-E-3134 | Specification Change Notice (Computer Programs) |
| DI-E-3135 | Characteristics and Performance Data |
| DI-E-7031 | Drawings, Engineering and Associated Lists |
| DI-H-3253 | Qual, Quant, Personnel Rqmts Info--Field |
| DI-H-3254 | Qual, Quant, Personnel Rqmts Info--Depot |
| DI-H-3265A | Training Planning Information |
| DI-H-7048 | System Safety Hazard Analysis Report |
| DI-L-3311B | Explosive Hazard Class. Data |
| DI-L-3315A | Master Material Support Record (MMSR) Data |
| DI-L-3317A | Data Cards for Explosive Assemblies and Parts |
| DI-L-3333A | Decalcominias and Other Markings |
| DI-L-3339 | Container Design Retrieval and Selection |
| DI-L-6138 | Integrated Support Plan (ISP) |
| DI-L-6140 | Support Material List (SML) (Preoperational) |
| DI-L-6147A | Preservation and Packaging Plan |
| DI-L-7018A | AFTO Form 349, Maint. Data Collection Record |
| DI-L-7019 | AFTO Form 350, Reparable Item Proc. Tag |
| DI-L-7021 | Consumption/Usage Report (Preoperational) |
| DI-L-30316 | Logistics Support Analysis Record (LSAR) Data |
| DI-M-3402 | TO Status and Schedules |
| DI-M-3408 | Validation Record (Technical Orders) |
| DI-M-3410 | User's Manual (Computer Program) |
| DI-M-3411 | Computer Programming Manual |
| DI-M-6153 | Tech. Manuals/Commercial Literature |
| DI-M-6154 | Tech. Manual Plan (TMP) |
| DI-M-6156 | Tech. Manual (Contractor-furnished Equip. (CFE) Notices) |
| DI-P-3461 | Procurement Method Coding Document |
| DI-P-3472A | Procurement Data Packages and Lists |
| DI-P-3473 | Procurement Method Information |

Fig. 1. List of DIDs Investigated

| | |
|---|---|
| DI-P-3474 | Lubrication Requirements |
| DI-R-3535 | Reliability/Maintainability Allocations, Assessment, and Analysis Report |
| DI-R-3537A | Reliability/Maintainability Data Reporting and Feedback Failure Summary Reports |
| DI-S-3570 | Structural Integrity Report |
| DI-S-3584 | Weight Balance and Inertia Data--Aircraft |
| DI-S-3589 | Strength Summary and Operating Restrict. Rpt. |
| DI-S-3598A | Corrosion Prevention and Control Requirements |
| DI-S-6169 | Optimum Repair Level Analysis (ORLA) Report |
| DI-S-6173B | Facilities Requirements Plan |
| DI-S-6174B | Facilities Design Criteria |
| DI-S-6176 | Ground Support Equipment Recommendation Record |
| DI-S-6177A | Summary, Calibration/Meas. Requirements (CMRS) |
| DI-T-3714A | Acceptance Test Procedures |
| DI-T-3734A | Test Requirements Document |

Fig. 1 (Continued)

It was thought that possibly documents representing a particular DID could be obtained from a number of existing weapon system SPOs and ALCs and studied to help answer the questions. Unfortunately, a number of obstacles blocked this approach. Documents were difficult to find. Numerous updates of documents during a weapon system development and production made it hard to identify the final or complete document. Although DID numbers and titles were often identical, modifications unique to a particular contractor or the weapon system themselves made the DID documents dissimilar. The mass of documents required to study one DID soon made it apparent to the researchers that such a study approach for 60 DIDs was not practical. Lastly, the criteria to judge the importance of such documents was not in the scope of the researchers' knowledge.

The method of acquiring the required data from ALC data managers and users, as well as some DPMLs, was the approach taken by the researchers. The method would require the support of logistics managers (DPMLs) in each of the SPOs within ASD and those ALC data managers and users within each of the five ALCs of Air Force Logistics Command. Through this procedure, it was planned that those criteria needed to answer all the research questions could be obtained. The instrument planned to obtain these answers was that of a questionnaire designed with objective and subjective questions on each DID.

The Questionnaire

The value of a questionnaire in this situation is that it enables the researchers to obtain data concerning each DID directly from those ALC data managers and users who are responsible for the actual acquisition of the DIDs. Two other approaches to obtaining the data were considered; however, neither the use of a personnel interview nor telephone interview was as appropriate as the questionnaire. These other approaches were not appropriate because of the constraints of the researchers, which were their limited resources of time and capital. Personal interviews demanded that the researchers travel to each ALC. Just one such interview, when dealing with 11 questions on each of 60 DIDs, would have taken around 3 hours. By multiplying this 3-hour interview times the number of respondents, the concept of using a personal interview was quickly discarded. As for the telephone, it too had its problems. Time was also the primary reason for its rejection. The thought of a 3-hour telephone call for one interview was totally unacceptable. Of equal concern was the difficulty of making contact with all respondents and the fact that the respondents would not have the questions and answers in front of them during the long call. With a questionnaire, these time problems were reduced.

With a written questionnaire the respondent was allowed to complete the questionnaire at his leisure.

Although this resulted in a time to answer period of around six weeks, this was acceptable. Also obvious was that with a questionnaire the researcher/interviewer did not have to be present with each respondent. This had the added value of reducing interviewer bias. The one concern of the questionnaire was the possible lack of an adequate return rate of completed questionnaires. This concern was reduced by having the research sponsor, AFALD/PT, sign out the cover letter to the questionnaire packages.

The questionnaire itself, as mentioned earlier, has eleven basic questions. These same eleven questions were asked on each of the 60 DIDs identified as the population. Therefore, the questionnaire consisted of 60 pages. A sample of one of the 60 pages is presented as Figure 2. The only difference in each of the 60 question pages was that the title of each page had a different DID number and title. Since each page had no connection with any other, the respondent had the convenience of stopping after any of the pages, do other work as required, and return to the other DIDs later. This was important since it was estimated that each page might take four minutes to complete.

It is apparent from Figure 2 that questions 1, 2, 3 and 6 utilized a Likert scale concept with a 5 or 6 point scale. This allowed for better interpretation and correlation studies of the answers by the respondents. An asterisk following the choices of "None" and "Never" to

## DI-M-3402 T.O. Status and Schedules

1. How would you rate your familiarity with this DID?
High___ Mod High___ Average___ Mod Low___ Low___ None___*

2. In your opinion, logistics personnel use this DID:
Always___ Usually___ Sometimes___ Rarely___ Never___*

3. How valuable is this DID to logistics personnel?
High___ Mod High___ Average___ Mod Low___ Low___

4. In what phase is this DID generated by the contractor?
Concept___ Valid___ Full-Scale Dev___ Prod___ Deploy___ Unknown___

5. Logistics personnel use this DID in the following phases/s:
Concept___ Valid___ Full-Scale Dev___ Prod___ Deploy___ Unknown___

6. For logistics, I would request this DID on future contracts.
Strongly Agree___ Agree___ Undecided___ Disagree___ Strongly Disagree___

7. Who specifically uses this DID? (Job Title) - Give an example of how this DID is used.

_____ - _____
_____
_____
_____ - _____
_____
_____

8. What are the impacts if this DID is not put on contract?

_____
_____
_____
_____

9. Office Symbol_____ Position Title_____

10. Years experience in data/related fields: _____.

11. System/equipment which accounts for most of your data knowledge?

_____.

* (If you answered "None" or "Never", go to next DID sheet.)

- Place any additional comments on back -

Fig. 2. Sample Questionnaire Sheet for One DID

questions 1 and 2, respectively, allowed the respondent to turn the page and address another DID. Questions 1 through 6 were quick answer multiple choice, while the subjective responses called for by questions 7 and 8 involved more time for thought. Relief came again on questions 9 through 11. They were used to record the personal background of the respondent and needed only be answered on the first DID page completed by the respondent. The actual content of the questions was designed to provide data to answer the research questions.

Question 1 asked the respondents to judge their own familiarity with the DID in question. It was an easy question to start off the questionnaire and provided a needed answer. It was hoped that data from respondents checking high to average familiarity could later be differentiated and compared to that data from respondents checking low familiarity.

Question 2 asked for an opinion, as most of the questions did, and its answers provided a direct piece of data needed to answer another of the research questions. It provided data concerning the degree to which the DID was used by logistics personnel and indirectly added to the solution of determining how valuable or critical one DID was with respect to another.

The third question was the most important question. It asked for the value or worth of the DID to logistics

personnel. Question 3, concerning the DID's value, was the primary question used to rank the 60 DIDs in terms of importance to logistics personnel.

Question 4 asked the respondent to choose among program phases when the DID in question was generated by the contractor. Knowing when it was actually generated could aid DPML and other data managers when negotiating the data package.

Like question 4, the fifth question again dealt with program phases and asked when the logistics community used the DID. The answers to this research question could also assist the DPML and other data managers during negotiations. If the DID is not required for use until aircraft deployment, then this could possibly result in a dollar savings by not ordering the DID until just prior to deployment.

Question 7 was the first of two subjective type questions. It asked for examples of who uses the DID and how it is used. Such knowledge concerning each DID should help the DPML and data managers better understand each DID and hopefully give them an advantage when they negotiate or defend the need for such a DID. Although the ALCs usually send a team to defend the DID list they have sent to a SPO in response to a data call, they are not always available when decisions concerning data are made at the SPO. The DPML therefore may benefit from good answers to this question.

The eighth question asked for the respondent's belief as to what would be the impact of not receiving or procuring this DID on contract. Like all the others, the answers relied greatly on the respondent's experiences. The answers should again provide that extra needed data that DPMLs and data managers might need in their task of insuring that the logistics data required are bought.

Questions 9 through 11 all provided data about the respondent: the office symbol, position title, years experience in data, and the system/equipment responsible for most of the respondent's experience. Questions 9 and 11 provided control type information. Answers concerning the respondent's years of experience in data or related fields obtained from question 10 could add to or subtract from the validity of the answers to the other questions.

Overall, it was hoped that the questions within the questionnaire were presented well and did provide the data required to answer and address the problem and research questions. It was also believed that since the questionnaire went out as an official request from AFALD/PT to each of the ALCs and DPML offices, more valid replies would be given.

General Procedures

This section involves the methods by which the questionnaires were distributed, collected and treated once

gathered. As stated in the section on acquiring data, two separate groups answered the questionnaire. The first group discussed here will be the data managers and data users at the ALCs. This will be followed by a similar discussion of collection and treatment methods of data from the SPO DPMLs.

Data distribution and collection. To start the process for the ALCs, telephone calls were made in advance to the Chief of the Sub-Command Data Management Office at each of the ALCs. In this effort the researchers briefed each of these managers on the content and scope of the questionnaire. The respondents understood that a cover letter from AFALD/PT would accompany the questionnaire and that detail instructions as required would be included. All of the respondents contacted were receptive to the effort, and stated that they would support it. This step was critical since these Sub-Command Data Management Office (SCDMO) Chiefs had control over the data managers throughout each ALC. With this support, the plan was to have one complete questionnaire, containing 60 pages (one page per DID), answered by each SCDMO and data manager below her/him.

With the concern that the ALC SCDMO data managers may lack knowledge of all 60 DIDs, the SCDMOs also agreed to have smaller DID questionnaire packages passed along to some ALC functional specialists. The plan for distribution at each ALC was as follows:

1. All DID questionnaire packages for each ALC would be sent to the specific SCDMO for each ALC.

2. The SCDMO would complete one 60-page questionnaire (one page per DID).

3. The SCDMO would then pass a group of DID questionnaires to each of the data managers below him/her. This group of DID questionnaires would contain one complete 60-page DID for the data manager to complete, along with a number of smaller DID packages designed for specific functional specialists. Each unique DID questionnaire was identified on the front page with the title of the functional specialist it was designed for. Appendix A presents a list of the DIDs that made up each of the unique questionnaires. The functional specialists involved were: logistics (program) managers, item managers, engineering data technicians, T. O. data technicians, engineers, provisioning specialists, software engineers, and equipment specialists.

4. Each data manager was given two unique DID packages for each functional specialty, which he/she passed out randomly to functional specialists within his/her office.

All questionnaires, complete (60 DIDs) and unique, were returned to the SCDMO upon completion and returned to AFALD/PT. Due to the length of the questionnaire and the wish not to burden the respondents, a return date allowing at least six weeks for completion was stated in the cover letter.

The questionnaires for the SPO DPML within ASD were hand carried to each office by the researchers. This was easily accomplished since the researchers were located at Wright-Patterson Air Force Base (WPAFB) where all of the ASD SPOs were located. Each DPML was asked to fill out an entire questionnaire. Additional questionnaires were given to the DPML if he/she felt that other personnel in that logistics office could contribute to the survey. All questionnaires filled out by the DPMLs were sent back to AFALD/PT. The process of grouping and treating these data began as the questionnaires returned to AFALD/PT.

Treating the data. A large portion of the data received from the questions were of an ordinal scale form. Specifically, questions 1, 2, 3 and 6 were ordinal in that each answer could be thought of as greater than or less than its neighbor, and ordinal scales are often used in opinion and preference studies (4:115), as in this study. With this in mind and the fact that numerical answers were needed to perform statistical studies, the verbal word type answers of questions 1, 2, 3 and 6 were assigned numerical values. A "1" was designated to represent the terms "High," "Always," and "Strongly Agree" as the upper bound of the questions, while the number "5" was assigned to "Low," "Never," and "Strongly Disagree" responses as the lower bound of the questions. The terms in between were given numerical values

accordingly. Although it seems that some researchers argue against assigning numerical value in such cases, the researchers of this study felt that

> . . . the best procedure would seem to be to treat ordinal measurements as though they were interval measurements, but to be constantly alert to the possibility of gross inequality of measurement [4:116].

For questions 4 and 5, the program phases were also assigned numbers for ease of entry on the computer. From the left, "Conceptual" was assigned the number "1," with others following in sequence to the number "6" for the last choice of "Unknown." The many different anticipated answers of questions 7 and 8 were compared to the "Purpose" block of the DID explanation form, DD Form 1664. Answers adding to the value of that "Purpose" block were included in the results. Question 10, years' experience, was already in numerical form; however, these figures were assigned to one of five age groups and numbered accordingly. Once entered as data on a computer file, a statistical study was performed on a number of the questions, as well as a subjective study of the questionnaire data.

Data Analysis Plan

It was planned that the analyses of the questionnaire would fall into two categories. The first category involved those questions that lent themselves to statistical study, while the second category concerned those that did not.

Statistical studies. Those questions that were studied in a statistical manner were questions 1 through 6 and 10. All of these questions underwent frequency distribution studies and since each of the questions had at least five answers to choose from, the frequency distributions were satisfactory. "Usually an effective number of classes is somewhere between 4 and 20 [6:27]."

Due to the desire to obtain the best answers possible in questions 2 through 8, it was the decision of the researchers not to use the answers of other questions when the respondent checked "None" to question 1, which asked for the respondent's knowledge of the DID. Only a few respondents continued to answer other questions on the DID after checking "None" to question 1.

The frequency distributions for questions 4 and 5 answered questions concerning when the contractor generated the DID, and when it was needed by logistics personnel. As mentioned earlier, the frequency distributions of questions 1, 2, 3 and 6 were helpful in providing answers to the original research questions.

Subjective studies. Questions 7 and 8 were subjective in the sense that there were no choices for the respondents to choose from. Both were open-ended questions. Looking at question 8 first, it asked the respondent what might be the impact if a particular DID was not on contract. It is

planned that these answers might assist in the ranking of the DID's importance by understanding what might occur without them.

There were really two questions and answers to question 7, but they were closely related. By knowing who (what type of job position) uses a particular DID and with examples of what it was used for, back-up support data became available to help justify and understand the DIDs. It was planned that such information would enable the DPML or any other person to better understand each DID and to better defend its acquisition when the actual requestors of the DID are not available.

# Chapter 3

## ANALYSIS

This chapter explains and discusses the processing of the collected raw data from the point of the returned questionnaires to the development of the logistics value arrays presented as the final product. A total of 188 questionnaires were returned and form the quantitative base for the presented results. All five ALCs responded and four SPOs participated. The sample size selected was large enough to develop valid conclusions. Those conclusions are herein presented.

The returned questionnaires were first coded in such a manner as to allow processing by the AFLC computer (CREATE system). The actual processing of the raw data was conducted utilizing the Statistical Package for Social Sciences. The raw data were first sorted, then tabulated by question and then by DID. From these tabulations, the researchers were able to determine a tentative grouping of the DIDs according to relative importance.

### Coding

As explained in the second chapter, each of the questions on each DID page was given a numerical value. Although the data represented only an ordinal scale, the

replies were assigned numerical values in order to process the data by computer. The questions were assigned values from left to right with the most left reply being one and sequenced to the right by one. See Figure 3 for the value of specific replies. The assigned values are entered in the space designed for an answer.

Two areas of coding required a more extensive discussion. The first of these was the way in which missing replies were handled. The other was the coding and tabulation of the years of experience, question #10.

Missing data. As can be seen from Figure 3, there were three questions which could be answered "Unknown." All three of these were coded "6" and do not really classify as being missing data. The respondent either was not familiar with the DID, question #1, or did not know when the DID was generated and/or used, questions #4 and #5. In either case these replies were valuable data points in the analysis.

There were basically two types of missing values which needed to be controlled. The first of these was the case where the respondent replied " None " on question #1 or "Never" on question #2. The instructions in both of these cases instructed the respondent to go on to the next DID without completing the rest of the questions on this page. In a case like this, further replies on that DID were coded "0." (Code "0" was also used to indicate that the DID

1. How would you rate your familiarity with this DID?
High___ Mod High___ Average___ Mod Low___ Low___ None___*
(1) (2) (3) (4) (5) (6)

2. In your opinion, logistics personnel use this DID:
Always___ Usually___ Sometimes___ Rarely___ Never___*
(1) (2) (3) (4) (5)

3. How valuable is this DID to logistics personnel?
High___ Mod High___ Average___ Mod Low___ Low___
(1) (2) (3) (4) (5)

4. In what phase is this DID generated by the contractor?
Concept___ Valid___ Full-Scale Dev___ Prod___ Deploy___ Unknown___
(1) (2) (3) (4) (5) (6)

5. Logistics personnel use this DID in the following phases/s:
Concept___ Valid___ Full-Scale Dev___ Prod___ Deploy___ Unknown___
(1) (2) (3) (4) (5) (6)

6. For logistics, I would request this DID on future contracts.
Strongly Agree___ Agree___ Undecided___ Disagree___ Strongly Disagree___
(1) (2) (3) (4) (5)

7. Who specifically uses this DID? (Job Title) - Give an example of how this DID is used.

_____ - _____
_____
_____
_____ - _____
_____
_____

8. What are the impacts if this DID is not put on contract?

_____
_____
_____
_____

9. Office Symbol_____ Position Title_____

10. Years experience in data/related fields: _____.

11. System/equipment which accounts for most of your data knowledge?

_____.

* (If you answered "None" or "Never", go to next DID sheet.)

- Place any additional comments on back -

Fig. 3. Assignment of Numerical Values for Coding

sheet was included in the respondent's package but no questions were answered. This was a rare occurrence.

The second type of missing data was the case where a question was skipped. In this case the respondent was either unsure of an answer, did not understand the question, or for some reason simply failed to answer it. These missing answers were coded "9."

The other area of special interest was the coding of question #10, years experience. These were grouped into five groups: (1) less than 1 year experience, (2) 1-3 years experience, (3) 3-7 years experience, (4) 7-15 years experience, (5) more than 15 years experience. Such a grouping was considered to be sufficient to allow the researchers to determine, with some degree of confidence, the general level of experience represented by the respondents.

Processing

After having been coded, the data were transcribed to a coding sheet. The data were then entered into the computer by means of the interactive terminals from the coding sheets. For safety measures and to ensure the availability of the data to future researchers, the data were also punched on cards which will be stored for future use. (Contact thesis advisor, Charles Feeley, AFIT, for these raw data.) The interactive terminals allowed the researchers more flexibility in their data entry and they

were still able to preserve the data by means of punched cards.

SPSS Subprogram

Missing values. One advantage of the use of the SPSS package was the flexibility offered in handling missing data.

> SPSS has a number of features for processing such missing data. Each variable may have up to three values that are designated as "missing." The choice of these values is totally a matter of the user's discretion, and is used to designate the reason why proper data has not been obtained. Each of the statistical subprograms contains a number of options for processing missing data, and the user may select whichever option seems best suited to the particular analysis situation [7:17].

The discussion on missing data in a previous section aptly illustrates the need for special handling of this type of data. All questions had "0" and "9" treated as missing values. Question #1 had "6" treated as a missing value.

Subprogram FREQUENCIES. The FREQUENCIES subprogram was the primary means of tabulating the replies from the returned questionnaires. "This subprogram provides frequency tables and descriptive statistics for variables . . . [7:558]." Figure 4 displays the output from the FREQUENCIES subprogram for question #1 on DID sheet #14, DID E-3128, "Engineering Change Proposals."

The responses to the question are listed down the left-hand side of the output. In this case, the response "Blank--Not Fam" meant that a respondent did not answer any

Familiarity with DID

| Category Label | Code | Absolute Frequency | Relative Frequency (Percent) | Adjusted Frequency (Percent) | Cumulative Adj Freq (Percent) |
|---|---|---|---|---|---|
| High | 1 | 34 | 38.6 | 43.0 | 43.0 |
| Moderately High | 2 | 16 | 18.2 | 20.3 | 63.3 |
| Average | 3 | 26 | 29.5 | 32.9 | 96.2 |
| Moderately Low | 4 | 2 | 2.3 | 2.5 | 98.7 |
| Low | 5 | 1 | 1.1 | 1.3 | 100.0 |
| Blank--Not Fam | 0 | 1 | 1.1 | Missing | 100.0 |
| None | 6 | 8 | 9.1 | Missing | 100.0 |
| Total | | 88 | 100.0 | 100.0 | |

| | | | | | |
|---|---|---|---|---|---|
| Mean | 1.987 | Median | 1.844 | Mode | 1.000 |
| Std Dev | 0.993 | Range | 4.000 | | |
| Valid Cases | 79 | Missing Cases | 9 | | |

Fig. 4. Frequencies of Question #1 for DID-E-3128, Engineering Change Proposals

questions on that DID. (For other questions, the response "Blank--Not Fam" indicates a response of "None" on question #1.) The next column over labeled "CODE" is the code value assigned to that response as explained above in the section on coding. The "ABSOLUTE FREQUENCY" column tabulates to number of respondents that answer this question with that response. For instance, 34 respondents answered that their familiarity with DID E-3128 was high, 16 moderately high, 26 average, 2 moderately low, 1 low, 1 did not answer, and 8 had no familiarity--for a total of 88 responses.

The next three columns indicate the usefulness of the "MISSING VALUES" convention. The "RELATIVE FREQUENCY (PERCENT)" column indicates the percentage of the total number of respondents that answered with that response. For example, 38.6 percent of all respondents said that their familiarity was high. The next column, "ADJUSTED FREQUENCY (PERCENT)" displays that percentage of that response "with missing values excluded from the percentage base [7:198]." So, of all those that responded that they had some familiarity with this DID, 43.0 percent had high familiarity. The most right-hand column is simply a cumulative total of the previous column. In this case, 96.2 percent of the respondents with some familiarity had high, moderately high, or average familiarity. The "MISSING VALUES" convention was important, therefore, because the percentage of all respondents and of only knowledgeable

respondents can both be examined individually and together. The statistics at the bottom of the output simply give an indication of the distribution of the responses calculated with the exclusion of the missing data. The last line indicates the number of good responses and the number of responses which were not used in some of the calculations.

This subprogram was utilized on the first six questions of all 60 DID sheets in the questionnaires. The final output provided a tabulation of all responses on all DIDs. These were then transcribed onto the DID sheets for a final tabulation of all responses. Figure 5 shows a sample DID sheet and the results of the questionnaires. The numbers in the response spot indicate the total number of respondents that answered that particular response.

Subprogram CROSSTABS.

> Subprogram CROSSTABS enables the user to complete two-way to n-way joint frequency distribution tables. . . . Each of the two-way tables and subtables may be percentaged by column, row, percent of the total table, or any combination of the three. . . . Missing data can be handled according to . . . an option which prints missing data in the table but excludes it from the calculation of statistics [7:231].

The principle use of this subprogram was to compare the responses of two or more questions on the same DID sheet. For instance, questions #2 and #3 should be closely related. If a DID was used frequently, it should probably be of high value. These two questions did correlate in that way rather well.

questions on that DID. (For other questions, the response "Blank--Not Fam" indicates a response of "None" on question #1.) The next column over labeled "CODE" is the code value assigned to that response as explained above in the section on coding. The "ABSOLUTE FREQUENCY" column tabulates to number of respondents that answer this question with that response. For instance, 34 respondents answered that their familiarity with DID E-3128 was high, 16 moderately high, 26 average, 2 moderately low, 1 low, 1 did not answer, and 8 had no familiarity--for a total of 88 responses.

The next three columns indicate the usefulness of the "MISSING VALUES" convention. The "RELATIVE FREQUENCY (PERCENT)" column indicates the percentage of the total number of respondents that answered with that response. For example, 38.6 percent of all respondents said that their familiarity was high. The next column, "ADJUSTED FREQUENCY (PERCENT)" displays that percentage of that response "with missing values excluded from the percentage base [7:198]." So, of all those that responded that they had some familiarity with this DID, 43.0 percent had high familiarity. The most right-hand column is simply a cumulative total of the previous column. In this case, 96.2 percent of the respondents with some familiarity had high, moderately high, or average familiarity. The "MISSING VALUES" convention was important, therefore, because the percentage of all respondents and of only knowledgeable

## DI-E-3128 Engineering Change Proposals

1. How would you rate your familiarity with this DID?
High 34 Mod High 16 Average 26 Mod Low 2 Low 1 None 3 *

2. In your opinion, logistics personnel use this DID:
Always 41 Usually 26 Sometimes 11 Rarely 1 Never 0 *

3. How valuable is this DID to logistics personnel?
High 53 Mod High 16 Average 7 Mod Low 1 Low 1

4. In what phase is this DID generated by the contractor?
Concept 11 Valid 10 Full-Scale Dev 34 Prod 20 Deploy 1 Unknown 3

5. Logistics personnel use this DID in the following phases/s:
Concept 13 Valid 9 Full-Scale Dev 32 Prod 22 Deploy 1 Unknown 2

6. For logistics, I would request this DID on future contracts.
Strongly Agree 51 Agree 26 Undecided 2 Disagree 0 Strongly Disagree 0

7. Who specifically uses this DID? (Job Title) - Give an example of how this DID is used.

_____ - _____
_____
_____
_____ - _____
_____
_____

8. What are the impacts if this DID is not put on contract?

_____
_____
_____
_____

9. Office Symbol _____ Position Title _____

10. Years experience in data/related fields: (LESS THAN 1 YR) 7; (1-3 YR) 15; (3-7 YR) 17; (7-15 YR) 27; (OVER 15 YR) 20.

11. System/equipment which accounts for most of your data knowledge?

_____.

* (If you answered "None" or "Never", go to next DID sheet.)

- Place any additional comments on back -

Fig. 5. Number of Responses for One DID

Probably the best way to understand the use of the subprogram is to look at a page of output. Figure 6 presents such a table. This table represents a cross-tabulation of the responses to question #1, familiarity with the DID and question #10, years of experience for DID sheet #14, E-3128, Engineer Change Proposals. The possible responses and codes for the respective response for question #1 are listed down the left-hand side of the table. The groupings, as explained in the previous section on coding, and their respective codes for the responses to question #10 are listed across the top of the table.

Each individual cell of the table represents the number and percentages of respondents that answered with the response indicated in both the column and row headings. For instance, consider the fourth cell over in the first row. The column is headed "OVER 15 YRS," coded "5" and the row is headed "HIGH," coded "1." The elements in the cell are: "10," "30.3," "52.6," "12.8." The first of the numbers is the number of respondents that said they have high familiarity with the DID and over 15 years of experience in the data field or a related experience. The second number is the row percentage; 30.3 percent of those with high familiarity had over 15 years of experience. The third number is the column experience and indicates the percentage of respondents with over 15 years experience that had high familiarity with the DID, 52.6 percent. The last number is

FAMILIAR FAMILIARITY WITH DID BY YRS EXPERIENCE

| FAMILIAR \ YRS | 1 | 2 | 3 | 4 | 5 | BLANK=NO FAM | ROW TOTAL |
|---|---|---|---|---|---|---|---|
| 1 HIGH | 1 | 7 | 7 | 8 | 10 | 1M | 33 |
| | 3.0 | 21.2 | 21.2 | 24.2 | 30.3 | 0. | 42.3 |
| | 14.3 | 53.8 | 46.7 | 33.3 | 52.6 | 0. | |
| | 1.3 | 9.0 | 9.0 | 10.3 | 12.8 | 0. | |
| 2 MODERATELY HIGH | 2 | 2 | 2 | 5 | 5 | 0M | 16 |
| | 12.5 | 12.5 | 12.5 | 31.3 | 31.3 | 0. | 20.5 |
| | 28.6 | 15.4 | 13.3 | 20.8 | 26.3 | 0. | |
| | 2.5 | 2.6 | 2.5 | 6.4 | 6.4 | 0. | |
| 3 AVERAGE | 3 | 3 | 6 | 11 | 3 | 0M | 26 |
| | 11.5 | 11.5 | 23.1 | 42.3 | 11.5 | 0. | 33.3 |
| | 42.9 | 23.1 | 40.0 | 45.8 | 15.8 | 0. | |
| | 3.8 | 3.8 | 7.7 | 14.1 | 3.8 | 0. | |
| 4 MODERATELY LOW | 0 | 1 | 0 | 0 | 1 | 0M | 2 |
| | 0. | 50.0 | 0. | 0. | 50.0 | 0. | 2.6 |
| | 0. | 7.7 | 0. | 0. | 5.3 | 0. | |
| | 0. | 1.3 | 0. | 0. | 1.3 | 0. | |
| 5 LOW | 1 | 0 | 0 | 0 | 0 | 0M | 1 |
| | 100.0 | 0. | 0. | 0. | 0. | 0. | 1.3 |
| | 14.3 | 0. | 0. | 0. | 0. | 0. | |
| | 1.3 | 0. | 0. | 0. | 0. | 0. | |
| 0 BLANK=NOT FAM | 0M | 0M | 0M | 0M | 0M | 1M | 1M |
| | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| | 0. | 0. | 0. | 0. | 0. | 0. | |
| | 0. | 0. | 0. | 0. | 0. | 0. | |
| 6 NONE | 0M | 2M | 2M | 3M | 1M | 0M | 8M |
| | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| | 0. | 0. | 0. | 0. | 0. | 0. | |
| | 0. | 0. | 0. | 0. | 0. | 0. | |
| COLUMN TOTAL | 7 | 13 | 15 | 24 | 19 | 2M | 78 |
| | 9.0 | 16.7 | 19.2 | 30.8 | 24.4 | 0. | 100.0 |

NUMBER OF MISSING OBSERVATIONS = 10

Fig. 6. Familiarity versus Years Experience (DID-E-3128)

the total percentage. Of the total respondents, excluding missing data, i.e. those with no answer or no familiarity, 12.8 percent were highly familiar with the DID and had over 15 years of experience. Each of the other cells is interpreted in a similar manner.

The numbers down the right-hand side of the table indicate the total number of responses in the row and the percentage of total responses it represents, excluding missing data. For instance, 33 respondents indicated high familiarity; that represents 42.3 percent of the total number of respondents. The numbers along the bottom of the table are interpreted in the same manner but represent the total number of responses in the column and the percentage of the total responses which it represents.

This table represents the correlation between years of experience in the data field and the familiarity with this DID. It seemed to indicate, for this DID only, that familiarity increased as the years of experience increased. For instance, the only respondent that indicated low familiarity had less than one year experience. This is not an absolute correlation, however, as is evident from the respondent with over 15 years experience that had no familiarity with the DID.

Other correlation studies similar to these were performed on all 60 DIDs; however, due to the volume of output these products have been stored with the raw data and are available for specific review upon request.

# Chapter 4

# RESULTS

The output from the two subprograms described in the "Analysis" chapter were used to analyze, group, and finally rank the 60 DIDs into four groupings of relative value. This was probably the hardest area of the research and required a great deal of work and study. Several different methods of determining the final groupings were attempted.

## Alternative Methods

The questions which were considered to be the most important in determining the final product were questions #2, #3, and #6. If the DID was always used, highly valuable, and respondents strongly agreed that it should be put on future contracts, then it would rank in the top group. As the responses moved to the right on all three questions, the DID would fall into a lower group.

The first step in determining the method was a cross-tabulation of the three questions under consideration. While not perfectly correlated, they did show a positive correlation. As the value of the response on one question increased, the value of the other three also tended to increase. This indicated that there was a relationship

between the use of a DID, its value to logistics personnel, and the inclusion of that DID on future contracts.

A weighting scheme was developed initially to assign each response a particular value. This weight was assigned by multiplying the code of the response for question #2 times the code of the response for question #3 times the code of the response for question #6. For instance, if a respondent answered "Always" for question #2 (code = 1), "Moderately High" (code = 2) for question #3, and "Strongly Agree" (code = 1) for #6, the weight assigned to this response was 2 (1 x 2 x 1). Obviously, the lower the weight, the more important the DID. For each DID, then, these individual weights were computed and tabulated. Figure 7 shows a frequency distribution of the weights for DID E-3128.

From this tabulation, the three measures of central tendency were utilized in order to develop two separate rankings of the 60 DIDs. One ranking was established by ranking the means of the individual DIDs. For instance, in Figure 7, the mean is 13.090. This DID ranked below any DID whose mean was less than 13.090 and above any DID whose mean was greater than 13.090. A second ranking was established in the same manner only utilizing the median value. In both of these rankings ties were broken first by use of the modal value and then by use of the range of values.

| Code | Freq | Adj Pct | Cum Pct | Code | Freq | Adj Pct | Cum Pct | Code | Freq | Adj Pct | Cum Pct |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 30 | 38 | 38 | 9 | 1 | 1 | 68 | 40 | 1 | 1 | 90 |
| 2 | 5 | 6 | 45 | 12 | 5 | 6 | 74 | 48 | 1 | 1 | 91 |
| 3 | 4 | 5 | 50 | 16 | 3 | 4 | 78 | 54 | 4 | 5 | 96 |
| 4 | 5 | 6 | 56 | 18 | 1 | 1 | 79 | 60 | 1 | 1 | 97 |
| 6 | 5 | 6 | 63 | 24 | 5 | 6 | 86 | 96 | 1 | 1 | 99 |
| 8 | 3 | 4 | 67 | 36 | 2 | 3 | 88 | 108 | 1 | 1 | 100 |

Missing Data

| Code | Freq | Code | Freq | Code | Freq |
|---|---|---|---|---|---|
| 0 | 10 | | | | |

| | | | | | |
|---|---|---|---|---|---|
| Mean | 13.090 | Std Err | 2.400 | Median | 3.500 |
| Mode | 1.000 | Std Dev | 21.194 | Variance | 449.174 |
| Kurtosis | 7.170 | Skewness | 2.555 | Range | 107.000 |
| Minimum | 1.000 | Maximum | 108.000 | | |
| Valid Cases | 78 | Missing Cases | 10 | | |

Fig. 7. Frequency Distribution of Weights for DD-E-3128

Three other 1-60 rankings were developed by considering the cumulative percentages of responses. The first of these was built around question #2. The cumulative average for the first two responses was recorded. The DIDs were then ranked according to this value. For instance, Figure 8 shows the frequency distributions of the responses to question #2 for DID E-3128. Here 84.8 percent of the knowledgeable respondents rated the DID as being at least usually used. DIDs having cumulative frequencies greater than 84.8 percent were ranked above and those having cumulative frequencies less than 84.8 percent were ranked below this DID. The same type of procedure was used to establish rankings based upon the third and sixth questions.

Final Grouping

At this point, there existed five separate 1 to 60 rankings of the sixty DIDs under consideration. It should be obvious that the same DID was rarely ranked at the same number on all five rankings. The problem involved determining a synthesis of the five separate rankings.

A number of the DIDs were somewhat stable throughout all five rankings. For instance, DID E-3128 was ranked number 3, 4, or 5 on all five scales. Such DIDs were used as stable points on which to base the grouping of the other DIDs. The end result was the grouping of the sixty DIDs into four categories of logistic value--High Logistics

Value, Moderately High Logistics Value, Average Logistics Value, and Low Logistics Value.

The final grouping of the sixty DIDs is presented in Figure 8. It is hoped that this grouping will give the DPML and the SPO data manager a starting point in evaluating the Contract Data Requirements List (CDRL). While DIDs should not be added to contracts simply because they are grouped in the high or moderately high value groups, it should be determined that they have been considered for possible inclusion in the contract. Appendix B has been included as an easy to use reference to assist DPMLs in the ASD SPOs, instead of maintaining all of the thesis.

DIDs of High Logistics Value

| | |
|---|---|
| L-3317A | Data Cards for Explosive Assembly |
| E-7031 | Drawing, Engineering, & Assoc. Lists |
| E-3128 | Engineering Change Proposals |
| E-3120A | Computer Program Product Spec. |
| P-3472A | Procurement Data Pkg. and Lists |
| E-3122 | Config. Index (Computer Programs) |
| M-6153 | Tech. Manuals/Comm. Lit. |
| M-6156 | Tech. Manuals (CFE Notices) |

DIDs of Moderately High Logistics Value

| | |
|---|---|
| S-3584 | Weight Bal. and Inertia Data |
| T-3714A | Acceptance Test Procedure |
| S-6176 | Ground Support Equip. Recmd. Data |
| S-3570 | Aircraft Structural Integrity Plan |
| M-3402 | T. O. Status and Schedules |
| T-3734A | Test Requirements Doc. |
| E-3103A | Config. Item Product Fab. Spec. |
| E-3119A | Computer Program Dev. Spec. |
| E-3104 | Addendum Spec. |
| M-3408 | Validation Record (T. O.s) |
| S-3598A | Corrosion Control and Prevention |
| E-3134 | Spec. Change Notice (Comp. Prog.) |
| A-6102A | Support Equip. Plan (SEP) |
| M-3411 | Computer Programming Manual |
| M-6154 | Tech. Manual Plan (TMP) |
| L-7018A | AFTO Form 349 (MDCR) |
| L-3315A | Master Material Support Rec. Data |
| A-3029 | Agenda-Design Rev. and Config. Audits |
| E-3129 | Request for Dev./Waivers |
| L-6138 | Integrated Support Plan |
| S-6173B | Facilities Rqmts. Plan |
| L-30316 | Log. Support Anal. Record Data |
| M-3410 | Users Manual (Comp. Prog.) |
| R-3537A | Rel./Maint. Data Rqmt. & Feedback |
| L-3339 | Container Design & Retrieval |
| S-6169 | Opt. Repair Level Anal. Report |
| E-3102A | Config. Item Dev. Spec. |
| P-3461 | Procurement Method Coding Doc. |
| S-3589 | Strength Sum. & Op. Restrict. Rpt. |

Fig. 8. DIDs Ranked According to Their Logistics Value

DIDs of Average Logistics Value

| | |
|---|---|
| E-3130 | Process Specifications |
| S-6174B | Facilities Design Criteria |
| L-3311B | Explosive Hazard Class Data |
| L-6147A | Preservation and Packing Plan |
| E-3131 | Material Specification |
| E-3126A | Request for Nomenclature |
| E-3121 | Version Description Doc. |
| P-3473 | Procurement Method Info. |
| L-7021 | Consumption/Usage Listing |
| H-7048 | System Safety Hazard Analysis Report |
| R-3535M | Rel./Maint. AAA Report |
| L-3333A | Decalcomanias & Other Markings |
| L-6140 | Support Material List |
| S-6177A | Summary, Cal./Meas. Rqmt. (CMRS) |
| E-3135 | Charact. Performance Data |
| E-3109 | Serialized Item Ctrl. Record |
| E-3106 | Spec. Maintenance Doc. (Equip./Muni.) |

DIDs of Low Logistics Value

| | |
|---|---|
| H-3265A | Training Planning Info. |
| L-7019 | AFTO Form 350 (Reparable Proc. Tag) |
| P-3474 | Lubrication Requirements |
| E-3110A | Component Oper. Data Notice |
| H-3253 | Qual., Quant., Pers. Rqmts.-Field |
| H-3254 | Qual., Quant., Pers. Rqmts.-Depot |

Fig. 8. (Continued)

# Chapter 5

## CONCLUSION AND RECOMMENDATIONS

### Conclusion

The goal of this thesis was to develop a package that would assist the DPML/logistics manager within a new weapons SPO in his/her task of identifying and contracting for logistically valuable DIDs that are funded for by the SPO. This goal was accomplished through the help of SPO DPMLs, ALC data managers, and ALC data users that responded to a lengthy questionnaire concerning 60 DIDs. The results of the thesis are presented in an easy to use summarizing document entitled "The DID Cookbook for DPMLs," listed as Appendix B. This "cookbook" was developed by placing each of the 60 DIDs in one of four categories of logistics value as judged through analyses of the data provided by the returned questionnaires. The categories are (1) DIDs of High Logistics Value, (2) Moderately High Logistics Value, (3) Average Logistics Value, and (4) Low Logistics Value. Along with the list of DIDs falling into a specific category, a brief description of each DID's use/purpose was developed.

Appendix B, "The DID Cookbook for DPMLs," provides a ready reference and starting point for the DPML and ALC

and SPO data management personnel. The list is not intended to be the last word on the acquisition of logistically important data. It is intended to be used with discretion and as an aid to the personnel involved in the acquisition of such data.

The researchers feel that the results of this thesis will be valuable to DPMLs/logistic managers, and also feel that greater emphasis should be placed on data acquisition since it is a high cost item for USAF.

The researchers, through their study, foresee quantum changes in the role and format of data in the near future. The impact of computers on data, in areas like technical orders, drawings and training, must be transitioned from places like the Air Force Human Resources Laboratory to data managers. The Air Force must do this in order to cope with the type of data contractors will soon provide to us.

Recommendations

Presented below are a number of recommendations for use and future study. Some of the recommendations for study involve simple statistical manipulations of the data collected in this thesis; others may involve studies as detailed as a thesis themselves. In those cases that require the use of the data gathered through questionnaires returned in this thesis, feel free to contact Mr. C. J.

Forzono in AFALD/PTEEL, WPAFB OH; or the advisor for this thesis, Mr. Charles Feeley, AFIT/LSY.

1. The foremost recommendation that the researchers can make is that the DPMLs, SPO data management personnel, and ALC personnel responding to data calls make use of results of this thesis. It is not intended that the DPML should blindly require that all high value and moderately high value DIDs be put on contract and delete all low value DIDs. It is intended, however, that the DPML use the categories as a basis for questioning DIDs placed on contract. If a DID in the moderately high value category is not placed on contract, the DPML should question why. Hopefully, only those DIDs which an individual program actually needs and will use should be placed on contract.

2. With the questionnaire data, a statistical study between the respondent's job title and degree of DID familiarity would be interesting. Such a study might identify what type of persons (through job title) had the most general knowledge of logistically valuable DIDs. Information of this sort may be useful as one criteria in selecting future logistic data managers in the ALCs.

3. Another question responded to in the questionnaire, but not analyzed, was during what contract phase were individual DIDs generated by the contractor, and during what phase were these DIDs used by logistics personnel. The results of such a study could assist the DPML and others on

the question of whether the purchase or order of specific DIDs could be deferred until a later date. The assumption being that deferral will save money.

4. In conjunction with the results of this study, it would be valuable to identify the normal cost to the government of each DID. The authors of this thesis attempted this early in their study, but found it a difficult task. Such a product would be very valuable to the DPML for example when he participates in the decision of which DIDs will or will not be put on contract.

5. Another recommendation is that other studies similar to this one be performed with other specific DID users in mind. Besides the DPML that represents logistics, the using commands, ATC and ASD, also have specific data needs. These needs should also be categorized by DIDs of high to low importance.

6. Lastly, with the knowledge of the authors that the product of this thesis is not perfect, it is recommended that another study be performed along similar lines. Possibly a greater emphasis should be placed on getting the opinions of more users of logistically valuable data bought by the SPO, and less on the opinions of logistics data managers themselves. Hopefully the work accomplished by this present thesis will be of value in reducing the larger task of contacting all types of users of logistically value data.

If it is not possible to get another AFIT thesis team to address some of the recommended future study areas, possibly AFALD could use some in-house resources to do these investigations. The area of data acquisition and management is costly and important, and should receive appropriate attention.

# APPENDICES

# APPENDIX A

# MAKEUP OF DID QUESTIONNAIRE PACKAGES

While the ALC data managers and logistics managers/ DPMLs within ASD System Program Offices (SPOs) were asked to complete an entire questionnaire package, consisting of all 60 DIDs listed in Figure 1 of the main report, other functional specialists received smaller packages. This appendix presents lists of those DIDs, including DID number and title, that made up these smaller packages. Each list is headed by the functional title of the person asked to respond to that package of DID questionnaires. The functional specialists were as follows:

Logistics (Program) Managers

Item Managers

Engineering Data Technicians

T. O. Data Technicians

Engineers

Provisioning Specialists

Software Engineers

Equipment Specialists

Logistics (Program) Managers

| | |
|---|---|
| DI-A-3029 | Agenda-Design Rev., Config. Audits |
| DI-L-6138 | Integrated Support Plan |
| DI-L-6140 | Support Material List |
| DI-L-7021 | Consumption/Usage Rpt. |
| DI-L-30316 | Log. Support Anal. Rec. |
| DI-S-6173B | Facilities Req. Plan |
| DI-S-6174B | Facilities Design Criteria |

Item Managers

| | |
|---|---|
| DI-E-3109 | Selected Item Config. Records |
| DI-E-3110A | Component Op. Data Notice |
| DI-E-3126A | Request for Nomenclature |
| DI-L-3315A | Master Material Support Rec. |
| DI-L-6140 | Support Material List |
| DI-L-6147A | Preservation & Pkg. Plan |
| DI-L-7021 | Consumption/Usage Report |
| DI-L-30316 | Log. Support Anal. Record |
| DI-P-3461 | Procurement Method Coding Doc. |
| DI-S-6169 | Optimum Repair Level Anal. Rpt. |

Engineering Data Technicians

| | |
|---|---|
| DI-E-3103A | Config. Item Product Fab. Spe. |
| DI-E-3104 | Addendum Spec. |
| DI-E-3106 | Specification Maint. Doc. |
| DI-E-3130 | Process Spec. |
| DI-E-3131 | Material Spec. |
| DI-E-7031 | Drawings, Eng. & Assoc. Lists |
| DI-P-3472A | Procurement Data Pkg. and Lists |
| DI-P-3473 | Procurement Method Information |
| DI-P-3461 | Procurement Method Coding Doc. |
| DI-T-3714A | Accept. Test Procedures |

T. O. Data Technicians

| | |
|---|---|
| DI-L-3333A | Decalcomanias and Other Markings |
| DI-M-3402 | T. O. Status and Schedules |
| DI-M-3408 | Val. Record (T. O.) |
| DI-M-6153 | Tech. Manuals/Comm. Literature |
| DI-M-6154 | Tech. Man. Plan |
| DI-M-6156 | Tech. Manual (CFE Notices) |

Engineers

| | |
|---|---|
| DI-A-3029 | Agenda-Design Reviews, Config. Audits |
| DI-E-3102A | Config. Item Dev. Spec. |
| DI-E-3103A | Config. Item Product Fab. Spec. |
| DI-E-3104 | Addendum Spec. |
| DI-E-3106 | Specification Maint. Doc. |
| DI-E-3128 | Eng. Change Proposal |
| DI-E-3129 | Request for Dev./Waiver |
| DI-E-3130 | Process Spec. |
| DI-E-3131 | Material Spec. |
| DI-E-3135 | Characteristics & Perf. Data |
| DI-E-7031 | Drawings, Eng. & Associated Lists |

Engineers (Continued)

| | |
|---|---|
| DI-H-7048 | Sys. Safety Hazard Anal. Rpt. |
| DI-L-3311B | Explo. Hazard Class. Data |
| DI-L-6138 | Integrated Support Plan |
| DI-L-30316 | Logistics Support Anal. Rec. |
| DI-P-3474 | Lubrication Req. |
| DI-R-3535 | Rel./Maint. Rpt. |
| DI-R-3537A | Rel./Maint. Failure Sum. Rpt. |
| DI-S-3570 | Structural Integrity Rpt. |
| DI-S-3584 | Wt. Bal. & Inertia Data |
| DI-S-3589 | Strength Summary & Op. Restrict. Rpt. |
| DI-S-3598A | Corrosion Prevention & Control Req. |
| DI-T-3714 | Accept. Test Procedures |
| DI-T-3734A | Test Req. Doc. |

Provisioning Specialists

| | |
|---|---|
| DI-A-6102A | Support Equip. Plan |
| DI-L-6147A | Preservation & Pkg. Plan |
| DI-S-6177A | Summary, Calibration/Meas. Req. |
| DI-S-6176 | Ground Support Equip. Recomm. Record |

Software Engineers

| | |
|---|---|
| DI-E-3119A | Computer Program (C. P.) Dev. Spec. |
| DI-E-3120A | Computer Program Product Spec. |
| DI-E-3121 | Version Description Doc. (C. P.) |
| DI-E-3122 | Config. Index (C. P.) |
| DI-E-3134 | Spec. Change Notice (C. P.) |
| DI-M-3410 | User's Manual (C. P.) |
| DI-M-3411 | Computer Programming Manual |

Equipment Specialists

| | |
|---|---|
| DI-A-3029 | Agenda-Design Reviews, Config. Audits |
| DI-A-6102A | Support Equip. Plan |
| DI-E-3102A | Config. Item Dev. Spec. |
| DI-E-3103A | Config. Item Product Fab. Spec. |
| DI-E-3104 | Addendum Spec. |
| DI-E-3106 | Specification Maint. Doc. |
| DI-E-3109 | Selected Item Config. Rec. |
| DI-E-3110A | Component Operation Data Notice |
| DI-E-3126A | Request for Nomenclature |
| DI-E-3128 | Eng. Change Proposals |
| DI-E-3129 | Request for Dev./Waiver |
| DI-E-3135 | Characteristics & Perform. Data |
| DI-E-7031 | Drawings, Eng. & Associated Lists |

Equipment Specialists (Continued)

| | |
|---|---|
| DI-H-3253 | Qual., Quant., Pers. Rqmts., Field |
| DI-H-3254 | Qual., Quant., Pers. Rqmts., Depot |
| DI-H-3265A | Training Plan Info |
| DI-H-7048 | Sys. Safety Hazard Anal. Rpt. |
| DI-L-3311B | Explosive Hazard Class. Data |
| DI-L-3315A | Master Material Support Rec. |
| DI-L-3317A | Data Cards for Explo. Assembly |
| DI-L-3333A | Decalcomanias and Other Markings |
| DI-L-3339 | Container Design Retrieval & Selection |
| DI-L-6138 | Integrated Support Plan |
| DI-L-7018A | AFTO Form 349 |
| DI-L-7019 | AFTO Form 350 |
| DI-L-30316 | Log. Support Anal. Rec. |
| DI-M-3402 | T. O. Status and Schedules |
| DI-M-3408 | Validation Record (T. O.) |
| DI-M-6153 | Tech. Man./Comm. Lit. |
| DI-M-6154 | Tech. Man. Plan |
| DI-M-6156 | Tech. Man. (CFE Notices) |
| DI-P-3474 | Lubrication Req. |
| DI-R-3535 | Rel./Maint. Anal. Rpt. |
| DI-R-3537A | Rel./Maint. Failure Sum. Rpt. |
| DI-S-3570 | Structural Integrity Rpt. |
| DI-S-3584 | Wt. Bal. and Inertia Data |
| DI-S-3589 | Strength Sum. & Ops. Restrict. Rpt. |
| DI-S-3598A | Corrosion Prevention & Control Req. |
| DI-S-6177A | Sum., Calibration/Meas. Req. |
| DI-S-6169 | Optimum Repair Level Anal. Rpt. |
| DI-S-6173B | Facilities Req. Plan |
| DI-S-6174B | Facilities Design Criteria |
| DI-S-6176 | Ground Support Equip. Recom. Record |
| DI-T-3714A | Accept. Test Procedures |
| DI-T-3734A | Test Req. Doc. |

# APPENDIX B

# THE DID COOKBOOK FOR DPMLS

This appendix was developed to briefly state the purpose of the thesis, some of the assumptions and facts, and to present the results in an easy to understand/use format. Since the results presented are not absolutes, the following paragraphs concerning the purpose and facts of this thesis should be read and understood. Any specific questions concerning the thesis can be addressed to Mr. C. J. Forzono, AFALD/PTEE, Wright-Patterson AFB, 45433.

The purpose of this thesis was to develop a package that contained a ranking of Data Item Descriptions (DIDs) in terms of their logistics value. The package was specifically designed for the Logistics Manager/Deputy Program Manager for Logistics (DPML) located within Aeronautical Systems Division SPOs (System Program Offices); however, data managers and users within the Air Logistic Centers (ALCs) may also find some value in the results. The DIDs studied were only those funded by ASD SPOs and not those DIDs normally funded by an ALC (in accordance with AFLC/AFSC-172-6). For example, ALCs usually fund provisioning DIDs themselves and although they are procured through the SPO, SPO personnel do not question or review the ALC funded DID list. With this fact, it was felt that SPO logistic managers/DPMLs needed a ready reference that would help them understand the logistics value of the DIDs being funded by the SPOs.

In developing the thesis, Contract Data Requirements Lists (CDRLs) from a number of existing aeronautical systems contracts were reviewed, analyzed, and condensed to 60 DIDs that the authors thought to be of possible logistics value. Questionnaires were constructed that would reveal the logistics usefulness or expected value of these 60 DIDs and forwarded for completion to ALC data managers, ALC data users, and selected SPO logistics managers/DPMLs. The DIDs listed in the tables following this section are ranked in terms of logistics value according to the responses of AFLC/ALC personnel, and not by personnel in commands such as TAC, SAC, AFSC, etc. Therefore, DIDs categorized here as low logistics value might well be of high value to other commands. The DIDs are ranked in terms of four categories of logistics value: High Logistics Value, Moderately High Logistics Value, Average Logistics Value, and Low Logistics Value. A detailed description of how this ranking was established is presented in the main body of the AFIT thesis (LSSR 12-80). The tables are constructed such that the "High Logistics Value" DIDs are presented in descending logistics value. At the beginning of each category there is a listing of the DIDs within that category by DID number and title. This listing is followed by a brief description of the purpose of each of the DIDs presented. It is hoped that through the availability of this package the logistics managers/DPMLs within ASD SPOs will be better able to identify those

logistically valuable DIDs and insure that they are evaluated and considered for inclusion in aeronautical systems acquisition contracts.

Table 1

DIDs of High Logistics Value

| DID Number | DID Title |
|---|---|
| L-3317A | Data Cards for Explosive Assembly |
| E-7031 | Drawings, Engineering, & Assoc. Lists |
| E-3128 | Engineering Change Proposals |
| E-3120A | Computer Program Product Spec. |
| P-3472A | Procurement Data Pkg. and Lists |
| E-3122 | Config. Index (Computer Programs) |
| M-6153 | Tech. Manuals/Comm. Lit. |
| M-6156 | Tech. Manuals (CFE Notices) |

Brief Descriptions of DIDs Listed Above

DI-L-3317A Data Cards for Explosive Assemblies, Sub-assemblies, and Parts

Data cards provide:

1. Minimum controls for identification of units and groups of units containing explosive mixtures procured by the Air Force.
2. A permanent file of data required to maintain administrative and physical control of such items entering Air Force inventory.
3. A means of identifying all items containing an explosive lot (or "batch") which provides defective.

DI-E-7031 Drawings, Engineering and Associated Lists

3.1 Provides information necessary for the acquisition of Engineering Drawings and Associated Lists to satisfy Government requirements of Level 1 (Conceptual and Developmental design); Level 2 (Production Prototype and Limited Production); and Level 3 (Production), as defined in DOD-D-1000B.

DI-E-3128 Engineering Change Proposals (ECPs)

Engineering Change Proposals (ECPs) are used to prepare, process, and incorporate Class I Engineering Changes to the applicable contract baseline, i.e., functional, allocated or product. The ECPs are used to analyze the performance/time/cost benefit of these changes.

Table 1 (Continued)

DI-E-3120A Computer Program Product Specification

The computer program product configuration identification documentation (specification) establishes the detailed technical description of the computer program configuration item (CPCI) to be delivered under the terms of the contract.

DI-P-3472A Procurement Data Packages and Lists

Provides for identification, selection, preparation, and acquisition of procurement data packages and their lists.

DI-E-3122 Configuration Index (Computer Program)

The Configuration Index provides a current status of specifications and selected additional documents which depend for their content on the CPCI configuration. It provides current status information concerning changes (ECPs) to specifications, test plans, handbooks, manuals, and version description documents.

DI-M-6153 Technical Manuals/Commercial Literature

Technical manuals for the official medium for providing technical information, instruction, and safety procedures pertaining to the operation, installation, maintenance, and modification of equipments and materials.

DI-M-6156 Technical Manual (Contractor-Furnished Equipment (CFE) Notices)

To obtain information and authorization for the selection and furnishing of CFE technical manual data from the system/equipment contractor, subcontractors, and vendors.

Table 2

DIDs of Moderately High Logistics Value

| DID Number | DID Title |
|---|---|
| S-3584 | Weight Bal. and Inertia Data |
| T-3714A | Acceptance Test Procedure |
| S-6176 | Ground Support Equip. Recmd. Data |
| S-3570 | Aircraft Structural Integrity Plan |
| M-3402 | T. O. Status and Schedules |
| T-3734A | Test Requirements Doc. |
| E-3103A | Config. Item Product Fab. Spec. |
| E-3119A | Computer Program Dev. Spec. |
| E-3104 | Addendum Spec. |
| M-3408 | Validation Record (T. O.s) |
| S-3598A | Corrosion Control and Prevention |
| E-3134 | Spec. Change Notice (Comp. Prog.) |
| A-6102A | Support Equip. Plan (SEP) |
| M-3411 | Computer Programming Manual |
| M-6154 | Tech. Manual Plan (TMP) |
| L-7018A | AFTO Form 349 (MDCR) |
| L-3315A | Master Material Support Rec. Data |
| A-3029 | Agenda-Design Rev. and Config. Audits |
| E-3129 | Request for Dev./Waivers |
| L-6138 | Integrated Support Plan |
| S-6173B | Facilities Rqmts. Plan |
| L-30316 | Log. Support Anal. Record Data |
| M-3410 | Users Manual (Comp. Prog.) |
| R-3537A | Rel./Maint. Data Rqmt. & Feedback |
| L-3339 | Container Design & Retrieval |
| S-6169 | Opt. Repair Level Anal. Report |
| E-3102A | Config. Item Dev. Spec. |
| P-3461 | Procurement Method Coding Doc. |
| S-3589 | Strength Sum. & Op. Restrict. Rpt. |

Brief Descriptions of DIDs Listed Above

DI-S-3584 Weight, Balance, and Inertia (Mass Properties) Data--Aircraft

Aircraft weight, balance, and inertia properties critically affect system performance, and up-to-date information is required to maintain cognizance of deleterious trends which may require SPO action.

Table 2 (Continued)

DI-T-3714A Acceptance Test Procedures

a. Used to determine compliance with the applicable specification requirements (Part II C1 Product Specification or equivalent) for the material to be delivered on the contract.

b. Basis for acceptance of the material by the Government representative.

DI-S-6176 Ground Support Equipment Recommendation Data (GSERD)

GSERD reflects the contractor's recommendation for GSE to support the end article. GSERD required by this document consists of two sections labeled figure 1a and figure 1b. Primary purpose of figure 1a is to provide sufficient initial engineering data for review of the contractor's description of a function requiring support together with his recommendations for development or procurement of a particular GSE item being recommended to satisfy one or more functions identified by end article maintenance engineering analysis. Primary

DI-S-3570 Aircraft Structural Integrity Plan

This plan defines the contractor's activities, cost and schedule planning for achieving the USAF aircraft Structural Integrity Program requirements.

DI-M-3402 Technical Order Status and Schedules

To provide information concerning the status of technical orders being procured. Provides the procuring activity with data to determine whether technical orders are being processed and delivered in accordance with approved schedules.

DI-T-3734A Test Requirements Document

This item is used to identify performance and diagnostic test data. These data are used in the preparation of test packages (e.g., tapes, tape manuals, and interface items)

or test procedures for automatic, semi-automatic, or manual test equipment. The Test Requirements Document (TRD) specifies the tests and test conditions required for performance testing and fault diagnosis of an end item. All test parameters and test conditions shall be independent of any specific test equipment.

DI-E-3103A Configuration Item Product Fabrication Specification

The product configuration identification documentation (specifications and referenced drawings) establish the requirements for manufacture and acceptance of the configuration item (CI) to be delivered under the terms of the contract.

DI-E-3119A Computer Program Development Specification

The functional configuration identification and allocated configuration identification documentation (specifications) establish the performance, design, development, and test requirements for all Computer Program Configuration Items (CPCI) to be developed under the terms of the contract. It is used by the contractor as the "design to" document, and by the Air Force to assure that the design encompasses all the development requirements.

DI-E-3104 Addendum Specification

The addendum specification creates a new configuration item specification. The basic specification plus the addendum then becomes controlled and maintained as a separate and distinct specification independent of changes to the basic specification from which it was created. An addendum to an existing specification is used when there is a requirement to retain the existing configuration item for some applications.

DI-M-3408 Validation Record (Technical Orders)

To obtain documentation from the contractor to ensure that all operating and maintenance procedures (checkout, calibration, alignment, and scheduled removal and replacement

instructions and associated checklists) are validated by actual performance or simulation.

DI-S-3598A Corrosion Prevention and Control Requirements

To provide a requirement for the system contractor to report specific information related to the selection of corrosion resistant materials, the choice and application of corrosion preventive finishes and the type and use of sealants.

DI-E-3134 Specification Change Notice (Computer Program)

The Specification Change Notice (SCN) identifies a proposed change to a contractually applicable specification and, after approval, provides a record of the change and the associated ECP. The Specification Change Notice identifies the specific changes to the specification text.

DI-A-6102A Support Equipment Plan (SEP)

3.1 Outlines the contractor plan for the Support Equipment (SE) program for an end article.

DI-M-3411 Computer Programming Manual

This manual provides instructions to enable experienced computer programmers to prepare, interpret and alter computer programs. These computer programs will be written in a particular machine, assembly or compiler language, usually for a specific computer. The manual is based on the Computer Program Development and Product Specifications which describe the particular machine, assembly or compiler language in which new computer programs are to be written.

DI-M-6154 Technical Manual Plan (TMP)

To prescribe the general procedures, terms, and conditions governing the planning, selection, preparation, and delivery of technical manuals required for operation and maintenance of aeronautical system/equipment being procured.

Table 2 (Continued)

DI-L-7018A AFTO Form 349, Maintenance Data Collection Record

To report maintenance actions involving repair, calibration, certification, modification, or removal and replacement of reparable components. Information will be used to assess equipment readiness, product performance, and configuration accounting and for related logistics management programs.

DI-L-3315A Master Material Support Record (MMSR) Data

A Master Material Support Record identifies all of the components which comprise a depot recoverable type item, the peculiar tools and test equipment needed to repair/maintain the end item/depot recoverable type item. Provides mechanized data required by the IM/SM for maintenance management of a major system, its depot recoverable end items and other related end items designated for depot level maintenance.

DI-A-3029 Agenda--Design Reviews, Configuration Audits and Demonstrations

The agenda is used to notify the procuring activity of forthcoming design reviews and configuration management audits (e.g., SRRs, SDRs, PDRs, CDRs, FCAs, PCAs, and FORs) and other type of demonstrations required by the procuring activity. The agenda sets forth the purpose and objectives to be accomplished. A separate agenda is required for each design review, configuration audit and demonstration.

DI-E-3129 Request for Deviation/Waiver

Request for Deviation is used to obtain a specific written authorization, granted prior to manufacture of an item, to depart from a particular performance or design requirement of a specification, drawing, or other document for a specific number of units or a specific period of time. Request for Waiver is used to obtain a written authorization to accept a configuration item or other designated items, which during production or

Table 2 (Continued)

DI-L-6138 Integrated Support Plan (ISP)

The total recommended comprehensive plan, prepared by the contractor, for management and execution of the integrated logistics support program.

DI-S-6173B Facilities Requirements Plan

The purpose of this plan is to identify all facilities required to support a new system program throughout the life cycle of system development, acquisition, and operation. The information will be used in the preparation of facilities sections of system program documentation and for the development of facilities financial plan and budget estimates (Military Construction Program or other facilities funding areas).

DI-L-30316 Logistic Support Analysis Record (LSAR) Data

This DID identifies and describes those data products of the LSAR required by the Government or deliverable data. These data identify integrated logistic support requirements in a correlated and integrated fashion and provide the basis for ILS development and procurement action and decisions.

DI-M-3410 Users Manual (Computer Program)

This manual is used to provide Air Force and/or contractor personnel with the necessary instructions concerning usage of a computer program configuration item (CPCI) and instructions on how it is to be operated. The manual content and format shall be specifically designed to meet the needs of the intended user.

DI-R-3537A Reliability, Maintainability Data Reporting and Feedback Failure Summary Reports

These data are used for monitoring contractor failure data collection actions and correlation and integration with other failure data acquired from activities not under the purview of the contractor. Failure summary reports are

used to apprise the procuring agency of the types, severity, and frequency of failures occurring in activities under the cognizance of the contractor and of the status of remedial action being taken by the contractor.

DI-L-3339 Container Design Retrieval and Selection

To obtain from contractors selected descriptive and supporting information to be used as the basis for determining whether or not packaging/container designs already exist in the DOD inventory that may be used in lieu of new development. The information will also be used to evaluate costs and to identify control points (milestone of events) to insure meeting delivery schedules. The data may also be used to expand the Container Design Retrieval System (CDRS).

DI-S-6169 Optimum Repair Level Analysis (ORLA) Report

This report is to advise the procuring activity of the results of repair level analysis conducted during the contract definition and/or acquisition phases. This report will document and support the contractor's recommendations for optimum repair levels, repair versus discard-at-failure, Government furnished equipment (GFE), GSE spares, and spare parts provisioning.

DI-E-3102A Configuration Item Development Specification

The functional configuration identification and allocated configuration identification documentation (specifications) establish the performance, design, development, and test requirements for all configuration items (CIs) to be developed under the terms of the contract.

DI-P-3461 Procurement Method Coding Document

This Data Item Description is used to acquire and transmit the assigned codes recommended as to the method to be used by the Government in the procurement of replenishment spare parts for the contract end item and for vendor assemblies.

Table 2 (Continued)

| | |
|---|---|
| DI-S-3589 | Strength Summary and Operating Restrictions Report (Aircraft/Missiles) |
| This report will be used by the procuring agency to define restrictions for service operation of the aircraft/missile and to afford a basis for determining the practicability of modifying restrictions, of varying useful loads, and for making structural modifications. | |

Table 3

DIDs of Average Logistics Value

| DID Number | DID Title |
|---|---|
| E-3130 | Process Specifications |
| S-6174B | Facilities Design Criteria |
| L-3311B | Explosive Hazard Class Data |
| L-6147A | Preservation and Packing Plan |
| E-3131 | Material Specification |
| E-3126A | Request for Nomenclature |
| E-3121 | Version Description Doc. |
| P-3473 | Procurement Method Info. |
| L-7021 | Consumption/Usage Listing |
| H-7048 | System Safety Hazard Analysis Report |
| R-3535M | Rel./Maint. AAA Report |
| L-3333A | Decalcomanias & Other Markings |
| L-6140 | Support Material List |
| S-6177A | Summary, Cal./Meas. Rqmt. (CMRS) |
| E-3135 | Charact. Performance Data |
| E-3109 | Serialized Item Ctrl. Record |
| E-3106 | Spec. Maintenance Doc. (Equip./Muni.) |

Brief Descriptions of DIDs Listed Above

DI-E-3130 Process Specification

The process specification is used to identify a specific process which is essential to fabrication or procurement of a product or material used in a configuration item (CI).

DI-S-6174B Facilities Design Criteria

To identify to the using service and its designated facilities design and construction agency specific technical requirements upon which facilities' designs must be predicated. The criteria are qualitative in nature and can be translated by qualified facilities designers into construction bid packages that will result in facilities that are compatible with the new system and its support equipment, as well as meeting other special requirements of the using service. The system contractor's input to the total criteria package consists of those constraints that must be imposed upon facilities' designs to ensure compatibility with the system equipment.

Table 3 (Continued)

DI-L-3311B Explosives Hazard Classification Data

The purpose of this data item is to obtain the necessary information for assigning hazard classification, such as hazard class/division, storage compatibility group and Department of Transportation class and marking. Final classification is assigned by HQ USAF/IGD(SEV), Norton AFB, CA.

DI-L-6147A Preservation and Packaging Plan

These data are required for use in reprocurement actions, packaging cost analysis, and shipment preplanning functions at base/depot activities, and for providing packaging instructions to maintenance activities and all activities engaged in preparing retrograde shipment.

DI-E-3131 Material Specification

Material specifications are used to identify the specific requirements for a raw material, mixtures, or semi-fabricated material which are used in the fabrication of a product configuration item (CI).

DI-E-3126A Request for Nomenclature

Nomenclature is the combination of an authorized item name and (when required) the official Air Force type designation. This data item provides a means of obtaining adequate descriptive data for use in assigning nomenclature to airborne and ground electronic, photographic, aeronautical, and related items of equipment. Nomenclature is used in specification and drawing titles, maintenance, supply, procurement and planning documents, and physical items--the nameplate.

DI-E-3121 Version Description Document (Computer Programs)

The Version Description Document sets forth the exact version of a CPCI and the interim changes thereto. It is used to identify the current version, and accordingly, accompanies each version of a CPCI and each release of an interim

Table 3 (Continued)

version change to a CPCI (i.e., changes which occur between CPCI versions.)

DI-P-3473 Procurement Method Information

This data item description provides technical/engineering information essential for the Air Force to establish follow-on methods of procurement for configuration items.

DI-L-7021 Consumption/Usage Report (Preoperational)

3.1 To provide a report of the range and rate of the contractor's consumption/usage of Government- and contractor-furnished parts/equipment during preoperational support of an item of Defense materiel. The report, which encompasses all support material list (SML) and/or materiel requirements list (MRL) items furnished the contractor for inventory management, will be utilized by the Government to develop objective operational support requirements.

DI-H-7048 System Safety Hazard Analysis Report

Hazard Analyses are used to systematically identify and evaluate hazards, both real and potential, for their elimination or control.

DI-R-3535 Reliability and Maintainability Allocations, Assessments, and Analysis Report

This report is used to (1) evaluate the contractor's estimate of reliability and maintainability (the predicted growth, allocation, and degree of achievement of these characteristics in the configuration item and its constituent elements); (2) evaluate the current end potential reliability and maintainability of the configuration item design; (3) provide information to assist in directing and planning for reliability and maintainability and related program efforts; and (4) identify design features which are critical to reliability and maintainability.

Table 3 (Continued)

DI-L-3333A Decalcomanias and Other Markings

Decalcomanias (decals) are specially prepared paper containing designs, words, or numerals which may be transferred and permanently affixed to aircraft or other Air Force equipment. This data item description provides for the film positives from which decals are reproduced.

DI-L-6140 Support Material List (SML) (Preoperational)

The SML is a composite listing of all approved contractor furnished/Government furnished spares and repair parts, training equipment, and peculiar/common ground support equipment (GSE) to be provided for support of a preoperational program. It will be used for shipping instructions, contractor inventory management, and recovery of assets for Government support activities, at the termination of preoperational support program.

DI-S-6177A Summary, Calibration/Measurement Requirement (CMRS)

3.1 The CMRS is a contractor prepared summary of the technical requirements of a system, subsystem, and/or equipment outlining the measurement parameters, specifying ranges, accuracy requirements, and calibration intervals for each echelon of measurement.

DI-E-3135 Characteristics and Performance Data

The USAF Characteristics Guides present official characteristics and performance of aeronautical systems, propulsion systems, guided missiles and training equipment. They provide a single, objective source of systems information which affords a common data based used to report and compare system performance and characteristics. This data item description provides the input for preparation of the Characteristics Guides. These guides are published and managed by ASD (4950/TZH). WPAFB, OH.

AD-A087 086 AIR FORCE INST OF TECH WRIGHT-PATTERSON AFB OH SCHOOL--ETC F/G 5/1
AN ANALYSIS OF ESSENTIAL LOGISTICS SUPPORT DATA ITEMS.(U)
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Table 3 (Continued)

| | |
|---|---|
| DI-E-3109 | Selected Item Configuration Records (SICR)<br><br>The Selected Item Configuration Records (SICR) are used to obtain from contractors serial number data for selected items during the production phase of a weapon/support system. The SICR identifies by serial number the relationship of each selected item to a specific next higher assembly, up to and including the end piece of equipment along with elements of data required to establish operating time records. |
| DI-E-3106 | Specification Maintenance Document (Equipment/Munitions)<br><br>These specification maintenance documents are used to propose, establish, and record a change to an equipment/munitions specification. |

Table 4

DIDs of Low Logistics Value

| DID Number | DID Title |
|---|---|
| H-3265A | Training Planning Info. |
| L-7019 | AFTO Form 350 (Reparable Proc. Tag) |
| P-3474 | Lubrication Requirements |
| E-3110A | Component Oper. Data Notice |
| H-3253 | Qual., Quant., Pers. Rqmts.-Field |
| H-3254 | Qual., Quant., Pers. Rqmts.-Depot |

Brief Description of DIDs Listed Above

DI-H-3265A Training Planning Information

Part I highlights advancements in state-of-the-art which may require establishment of new or revision of existing training programs. It provides an appraisal of training implications imposed on AF by system/equipment proposal. Information is used by the AF to evaluate contractor's understanding of AF training policies and procedures; to insure continuity between training to be provided by the contractor.

DI-L-7019 AFTO Form 350, Reparable Item Processing Tag

AFTO Form 350 data will be used to identify equipment status and to aid in determining repair cycle time (serviceable-to-reparable-to-serviceable) for materiel management.

DI-P-3474 Lubrication Requirements

a. To facilitate logistic support of AF equipment in the field by assuring the availability of lubricants and related materials whose performance capability has been demonstrated by test in the equipment and whose requisite continuous quality is controlled by qualification to a specification.

b. To keep the total number of lubricants required for equipment support to a minimum.

c. To facilitate maximum standardization of lubricants among

Table 4 (Continued)

DI-E-3110A Component Operational Data Notice (CODN)

The Component Operational Data Notice (CODN) is used to obtain from contractors part number data for selected items during the production phase of a weapon support system.

DI-H-3253 Qualitative and Quantitative Personnel Requirements Information (QQPRI), Part I: Field and Organization Maintenance

QQPRI (Part I) is used as a source of data for development or revision of USAF personnel concepts or policies, the revision of the USAF classification system, the manning and utilization of personnel, and the development or revision of maintenance and operational plans or concepts. Specifically, QQPRI serves three basic purposes:

1. It permits the systematic identification of Air Force specialties and specialty codes required for a given system.

2. It provides for the orderly development of organizational tables and unit manning documents.

3. It establishes a valid basis for planning training programs.

DI-H-3254 Qualitative and Quantitative Personnel Requirements Information (QQPRI), Part II: Depot-Level Support

QQPRI (Part II) is used as a source of data for development or revision of depot maintenance plans and concepts. Part II serves three basic purposes:

a. It permits the systematic identification of skills required for a given system.

b. It provides for the orderly development of unit manning documents.

c. It establishes a valid basis for planning training programs.

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